

RIVERSIDE OXBOW FORT WORTH, TEXAS

CHAPTER 2 STUDY AREA DESCRIPTION EXISTING AND FUTURE CONDITIONS

This first section in this chapter describes the study area from a broad perspective, the Upper Trinity River watershed in Tarrant County. The material discussed includes information ranging from the general terrain and climate of the study area to a summary of the employment and economic status of the area. The next section of the chapter narrows the focus of discussion to existing conditions for the lands within the study area boundaries.

UPPER TRINITY RIVER BASIN – TARRANT COUNTY

EXISTING CONDITIONS

General Description. The Upper Trinity River has been considerably urbanized. It is significantly influenced by the amount of water it receives from watershed runoff, overflows from surrounding man-made reservoirs, and the controlled discharges from sewage treatment plants. The combined effects of urban development and flood control activities within the basin have permanently altered the river's hydroperiod and pre-settlement hydrologic and hydraulic conditions.

The Clear Fork and West Fork study area is located within a highly developed metropolitan area, leaving the floodplain areas adjacent to the river of major environmental concern. Several flood control projects have been constructed in the Clear Fork and West Fork study area. The Fort Worth Floodway is located immediately upstream of the Riverside Oxbow study area. In addition, water supply and flood control reservoirs have been constructed upstream on both the Clear Fork (Benbrook Lake) and the West Fork (Lake Worth and Eagle Mountain Lake). The environmental characteristics within this area were significantly modified by these projects' construction and implementation and subsequent development and flood damage reduction activities.

Climate. The climate of Tarrant County is humid with hot summers and mild winters. The climate can also be characterized as continental with a wide range in annual temperature extremes. The average winter temperature is 48 degrees Fahrenheit (°F) and the average summer temperature is 84°F. Mid-afternoon relative humidity is approximately 55 percent. In the winter, temperatures can suddenly drop due to the influx of modified polar air masses, but such episodes are of relatively short duration. Tropical maritime air masses from the Gulf of Mexico tend to dominate the climate of the region during the spring, summer, and fall. Total annual precipitation averages 36 inches, with 57 percent of rainfall occurring between April and September. This coincides with the

growing season for most crops in the area. Thunderstorms are common in the spring and occur approximately 40 days per year (Natural Resources Conservation Service, 1980).

Geology and Soils. Most of Tarrant County is located in the Coastal Plain Province and is underlain with nearly horizontal beds of hard limestone and shale of marine origin from the Fredericksburg and Washita groups of Cretaceous Age. Geological units present include Quaternary floodplain and terrace deposits near the surface, consisting of clays, sands, and gravels.

According to the *Soil Survey of Tarrant County* (U.S. Department of Agriculture et al. 1981), the soils in the Clear Fork and West Fork study area are generally Frio silty clay. This deep, nearly level, clayey soil is on floodplains of major streams. The soil is well drained with moderately permeability and slow surface runoff. The hazard of flooding is considered the main limitation of this soil for urban uses. The exception to the Frio soil type in the study area is the soils in the Tandy Hills area, which are comprised of the Aledo-Bolar-Sanger association. Generally, these are shallow, very shallow and moderately deep, gently sloping, sloping, and moderately sloping clay and loamy soils that are well drained with moderate permeability and medium to rapid surface runoff. During a soil survey of Tarrant County, Texas, in June 1981, the NRCS indicated that these soils are moderately suited to most urban uses. The main limitations of these soil types are depth to bedrock, slope, and seepage during the wet seasons. For development purposes the rock layer limits the amount of grading and leveling that can be easily done.

Hydraulics and Hydrology. As noted in Chapter 1, the study area is within the region covered by two major floodplain management policies, the ROD of 1988 and the CDC program. Therefore, the baseline conditions hydraulic model used for this study is the current CDC model for the West Fork of the Trinity River. The CDC model was originally developed using the backwater program HEC-2 Water Surface Profiles. The model was subsequently converted to HEC-RAS River Analysis System version 3.0. The CDC manual and the CDC program affirm local government authority for local floodplain management while establishing a set of common permit criteria and procedures for development within the Trinity River Corridor.

The Trinity River Steering Committee, consisting of local elected official from jurisdictions in the Trinity River Corridor, approved the first edition of the CDC manual May 23, 1991. Within the next two years, the participating communities (Arlington, Carrollton, Coppell, Dallas, Farmers Branch, Fort Worth, Grand Prairie, Irving, Lewisville) officially amended their floodplain ordinances to adopt the CDC common permitting criteria and process. In the CDC process, the CDC model is considered the design model for proposed development projects in the Trinity River Corridor. The CDC model was developed as part of the Upper Trinity River Feasibility Study. The CDC model is the design model used for analysis of proposed floodplain development projects within the Upper Trinity River Corridor.

The original CDC West Fork hydraulic models were developed by extensive use of digitized 2-foot contour interval topography. The topographic data was developed from February/March 1991 aerial photography. The majority of the cross-section data was supplied by the surveying contractor and generated from the topographic data, with cross-

sections locations developed by the U.S. Army Corps of Engineers. Additional cross-sections were developed in-house from the topographic files and included in the models as necessary. Other information used in the development of the models originated from bridge plans, bridge surveys, field reconnaissance, and levee surveys. Channel data originated from 1975 field surveys. Aerial photographs and field reconnaissance were used to determine roughness coefficients. The West Fork Trinity River CDC model limits are the confluence of the West Fork and the Elm Fork in Dallas County on the downstream side and the confluence to Lake Worth Dam on the upstream side, a distance of 58.08 miles.

The location of the Riverside Oxbow study area downstream of the Fort Worth Floodway and within the region covered by the ROD and the CDC process results in a set of criteria that must be followed for any proposed project design that impacts lands within the floodplain. These criteria include: 1) no rise in the design flood water surface profile (SPF) is allowed (USACE); 2) no rise in the Base Flood Elevation (BFE) 100-year flood (Federal Emergency Management Agency); 3) conditions outlined in the CDC process must be met; 4) Section 404 Record of Decision (ROD) which establishes hydrologic and hydraulic criteria for projects within the Trinity River floodplain in the Dallas-Fort Worth area, including no rise in water surface profile, no loss of valley storage, zero percent loss of valley storage in the 100-year event and no more than a maximum of five percent valley storage loss for the SPF event. Applicable mitigation for water surface increases and valley storage loss may be necessary and would be incorporated into detailed project design.

Water Quality. The Trinity River reach that flows through the study area is designated by the Texas Commission on Environmental Quality (TCEQ) Segment 806, the limits of which are identified as a point immediately upstream of the confluence of Village Creek with the West Fork in Tarrant County to Lake Worth Dam in Tarrant County. While the water quality of the Trinity River generally continues to improve, a few areas of concern remain in this segment. According to the State of Texas Clean Water Act Section 303(d) List (Draft 2002 305(b) Assessment), the lower 22 miles of this segment are impaired for fish consumption use and identified as a segment of concern for excessive algal growth. The assessment also noted that this segment was on the 2000 303(d) list for impairment due to bacteria, and because there were insufficient data to evaluate changes in water quality, this segment will be included on the 2002 303(d) list for bacteria. According to the latest round of tests conducted every two years by the TCEQ, PCBs and chlordane were found in the tissue of fish collected in this section and a Chlorophyll A assessment method indicated some concerns about the excessive amount of algal growth. The final results of the assessment summary state that aquatic life, public water supply, and general uses were fully supported for Segment 806 and contact recreation use was not assessed. The lower 22-mile section of Segment 806 includes the reach of the West Fork that flows through our study area. In fact, two of the monitoring sites for the lower 22 miles section of Segment 806 used during the recent testing were Riverside Drive and Beach Street in Fort Worth.

Air Quality. The study area is located within the Environmental Protection Agency's Air Quality Control Region (AQCR) 215 for Texas. AQCR 215 consists of 19 counties including Dallas, Denton and Tarrant counties. AQCR 215 is classified as a non-attainment area for ozone and attainment/unclassifiable for other National Ambient Air

Quality Standards including lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, and particulates (40 Code of Federal Regulations 52.2308(a)).

Terrestrial Resources. Tarrant County is situated primarily in the Cross Timbers and Prairies region (Correll and Johnston 1970; Gould 1975). The Cross Timbers and Prairies vegetative region, named for the closely associated prairie and woodland vegetation, extends south from the Red River to Austin, a distance of approximately 250 miles. Distinct changes in the vegetation cover of this region are associated with differences in soils and topography. This region is generally characterized by level to gently rolling and hilly limestone country with extensive shallow or gravelly soils and some areas of deep clay soils. Original plant cover was mid- to tall-grass prairie broken by wooded drainages and rock outcrops.

The Riverside Oxbow study area is located within the Fort Worth Prairie vegetational zone. The Fort Worth Prairie and the Lampasas Cut Plain are prairie components that together make up the Grand Prairie, which is the designated prairie in the Cross Timbers and Prairies region. According to Diggs et. al (1999) in Shiner's and Mahler's Illustrated Flora of North Central Texas, the presettlement condition of the Grand Prairie was largely a vast grassland, with wood vegetation generally limited to the areas along major watercourses, as scattered mottes on hilltops, or associated with mesas and buttes.

Vegetation. The predominate grass species for the Cross Timbers and Prairies vegetative region include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), and sideoats grama (*Bouteloua curtipendula*) (Gould 1975). Under natural conditions, tree species in the Cross Timbers and Prairies region include post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), and hackberry (*Celtis* spp.).

Wildlife. Historically, the river channels, riparian corridors, and wetlands associated with floodplains of the Trinity River supported a variety of wildlife species for cover, food, and nesting areas. Bird species commonly found in these areas included a wide variety of migratory songbirds and waterfowl, raptors such as the red-tailed hawk and American kestrel, and wading and shore birds such as herons and egrets. Amphibians, reptiles, and mammals common to these areas included frogs and toads, snakes, turtles, cottontail rabbits, cotton rats, field mice, opossum, raccoons, bobcats, beaver and coyotes.

Aquatic Resources. The Clear Fork and West Fork of the Trinity River, along with their associated tributaries and constructed reservoirs are the main water bodies in Tarrant County, in addition to some existing ponds and wetlands within the floodplain. However, due to the altered hydroperiod caused by construction and implementation of the reservoirs and major flood control projects, most of these smaller floodplain ponds and wetlands associated with the streams are dependent upon rainfall runoff for their water supply. In the long, hot Texas summers, many of these small bodies of water are either significantly reduced in size or dry up completely.

In certain areas, the river channel has a variety of aquatic resources, i.e. riffles, runs, and pools, which provide habitat for several species of invertebrates and fish. Studies conducted by Texas Parks and Wildlife Department, the University of North Texas'

Institute of Applied Sciences and University of Dallas (Dickson et. al. 1989), identified 12 families and 46 species of fish within the Upper Trinity River Basin, which includes the Clear Fork and West Fork. These studies verified that stream fisheries have improved since the 1970's and early 1980's, due primarily to improved water quality resulting from improved wastewater treatment. Sport fish present in the study area include largemouth bass, channel catfish, crappie, and white bass. Other species which tend to be more tolerant of moderate levels of nutrients and lower dissolved oxygen content in the area include common carp, river carpsucker, longnose gar, freshwater drum, several species of shiners, and bullhead catfish. Non-sport fish species found in the study area that are less tolerant to pollutants include gizzard shad, mosquito fish, and several sunfish species.

One of the major factors limiting the quality and diversity of the aquatic habitat along and in the river channel in the overall Clear Fork and West Fork study area is the lack of edge and instream vegetation and structure. This type of vegetation and structure would serve to provide food sources, shade, cover, and reproduction sites for multiple aquatic species, including invertebrates, and fish, in addition to waterfowl, and shore and wading bird species.

The wetlands and open water ponds found in the floodplain adjacent to the river generally support the same types of aquatic invertebrates and fish species as the river channel. While the wetland areas provide emergent vegetation and other physical habitat that is generally lacking in the river and most of the open water ponds, the altered hydrologic regime of the floodplain as a result of flood protection reservoirs and channelization projects upstream allows for only occasional overbank flows. These wetland areas often do not retain water throughout the year, but dry up during the long, hot summer months, thus reducing their aquatic habitat value. In addition, because of the reduced frequency of overbank flooding, these wetlands no longer function effectively within the watershed as reproductive and nursery sites for multiple species of invertebrates and fish. For these reasons, the overall diversity of the aquatic invertebrate and fish species within the Clear Fork and West Fork watershed remains relatively low.

Recreational, Scenic and Aesthetic Resources. The 1990 Texas Outdoor Recreation Plan (TORP), prepared by the TPWD, identifies existing recreational facilities, usage trends, and projected recreational needs for 23 regions within the state. The study area is within a 16-county area designated in the TORP as Region 4.

Region 4 has experienced several years of rapid growth. With approximately 350 people per square mile, the density of Region 4 is surpassed only by the Houston region. Many of the small towns and rural areas in Region 4 have become part of the rapidly expanding metropolitan area as people have moved from the heavily populated cities to the suburbs. People in these urbanizing areas are finding open space increasingly scarce. The region now ranks twenty-first out of 23 regions in recreation land per thousands population.

Residents of the Metroplex need not drive far to find recreational waters because many of the state's major reservoirs are located in the metropolitan area. A total of 232,581 surface acres gives the region more lake acres than all regions except Deep East Texas; however, the large numbers of people residing in the region make the suitable surface acres per thousands population still fall far below the state average.

With so many reservoirs in the area, the value of the free-flowing sections of the region's rivers increases as they become more rare. Public agencies within Region 4 are taking a fresh look at the valuable resources within their jurisdictions, which are highly desirable for recreation. Sites within the Trinity River floodplain are among those most actively studied. Nine cities and three counties within the region, including Tarrant County, are participating with the North Central Texas Council of Governments in development of a *Common Vision* to protect resources within this corridor. Goals include the development of a regional construction permit system and cooperation in the creation of a linear greenbelt of parks and trails along and adjacent to the river and its tributaries.

The most scenic wooded areas in Region 4 are often found in the stream and river corridors. Scenic corridors along the Trinity River, with natural meandering water courses bordered by riparian hardwoods or dense stands of trees and shrubs, are the most desirable segments of the river and the portions most intensely used by the recreating public. Recreation providers have expressed concern over stream bank erosion, in-stream flows, and the quality of the water for contract recreation. The Trinity River and its tributaries are currently being used for a variety of recreational activities, though access is limited or restricted. In spite of these limitations, avid canoeists, kayakers, fishermen, bicyclists and bird watchers have located points where parks areas, roads and bridges intersect with the river.

Socio-Economic Conditions. Tarrant County, with a population of 1,336,500 (estimated population as of January 1, 2001), has an economy centered on agricultural interests in the rural areas and the city of Fort Worth and its suburbs. Major Tarrant County employers include Burlington Northern, American Airlines/AMR, Alcon Laboratories, Lockheed Martin Corporation, Tandy Corporation and NAS Fort Worth Joint Reserve Base. It is anticipated that the region will continue to grow due to the influence of the increasing industry and employment opportunities and the relatively low housing and cost of living estimates.

The city of Fort Worth, with an estimated population of 542,504, serves as the county seat. According to *American Demographics*, April 1995, Fort Worth ranked eighth in the U.S. in projected population growth over the next ten years and 18th in employment growth. Fort Worth is a city whose economic base is diverse and expanding with companies involved in business activities ranging from cellular communications and semiconductor chip manufacturing to the defense and transportation industries.

RIVERSIDE OXBOW STUDY AREA

The study area, approximately 1060 acres in size, is located in the city limits of Fort Worth just east of the downtown area along approximately 3.14 river miles of the West Fork of the Trinity River. The upstream limit of the study boundary is Riverside Drive and the downstream limit is East 1st Street. The study area, which is located within a highly urbanized region, includes one of the largest contiguous tracts of undeveloped property within the city of Fort Worth. The major feature of the study area is a remnant of the original channel of the West Fork of the Trinity River that was separated from the river with the construction of a modified channel in the early 1970s. The resultant oxbow, which is approximately 1.58 river miles in length, collects water from local runoff and as backwater from the main river channel at its downstream confluence with the West Fork. Because of the size of the study area and differences in existing resources and possible ecosystem restoration opportunities, the study area was divided into zones to assist in the description of existing conditions and the evaluation process. The zones are Oxbow North, Oxbow Center, Oxbow South, Gateway Beach, Gateway Center, Gateway South, Gateway Park, Gateway East and Tandy Hills. Figure 4 displays the project zones and the limits of the 100-year floodplain within the study area.

The study team used several techniques to help identify, quantify and qualify existing conditions within the study area in order to projected future with- and without project conditions. These included but were not limited to:

- Site reconnaissance by a multiple disciplined, multi-agency group, including personnel from the USACE, TRWD, USFWS, TPWD, EPA, TRWD, and the city of Fort Worth Parks and Community Services
- Literature reviews
- Database searches
- Reviews of historic planning and plans and specification documents
- Reviews of prior and on-going permit actions
- Personal contacts with local utility companies
- Personal contacts and review of documents from various city of Fort Worth departments, such as the Water Department, Transportation and Public Works, Parks and Community Services, Real Property Management, Zoning and Platting
- Personal contact and review of documentation from the Tarrant County Tax Appraisal District
- Personal contact and review of documents from the Texas Department of Transportation
- Personal contacts with land owners within and adjacent to study area
- Series of public meetings held by TRWD, Streams and Valleys, and city of Fort Worth' Parks and Community Services personnel to solicit input and concerns from local citizens and interest groups about the river, Gateway Park, and the project area, etc.

EVALUATION AND ANALYSIS TECHNIQUES

The study team also employed satellite imagery to conduct vegetation classification for quantifying habitat types and habitat evaluation procedures to determine the quality of the existing habitat types.

Vegetative Cover Analysis. Satellite imagery used for this work effort were SPOT (French) satellite data acquired by USACE as part of a 1997 Interagency Agreement with the Environmental Protection Agency (EPA) to facilitate *Wetlands Study of Dallas-Ft. Worth Metroplex*. Two multi-spectral and two panchromatic (black and white) images were acquired to center on the Dallas County and Tarrant County within the Upper Trinity River study area. The four images date to late spring (April - June) 1996. The multi-spectral data is 20-meter resolution and the panchromatic is 10 meter. The data were classified in late 1997 by USACE for the Trinity River project into general landcover classes.

Image classification was conducted using ERDAS Imagine software. Unsupervised classification was done on the two multi-spectral scenes by grouping pixels in terms of multi-spectral characteristics using unsupervised (ISODATA) clustering methods to produce approximately 100 spectral classes for each image based on variability within the three multi-spectral bands. The classified images were then imported to GRASS GIS where they were each assessed against ground truth data (photos and fieldwork) to lump the 100 classes into about 12 general vegetation classes. The ground truth data used in the grouping of clusters included 1995 digital orthophotos, 1994 Landiscor hardcopy project orthophotos, existing ground truth field data collected by personnel from the USACE and USFWS, and limited field ground truthing trips. Some additional adjustment of classes was required to obtain a good edge match when the two files were merged into one vegetation map encompassing the two counties. The 12 general classes were further grouped to four categories that represent the most important types of vegetative cover within the study area.

Texas Parks and Wildlife Department, USACE, and USFWS personnel reassessed the accuracy of the classified image in the spring of 2001. With minor variations due primarily to slightly denser shrubbery and undergrowth, the land use had changed very little. The most significant variations were due to the fact that the images were collected during a dry period where areas of standing water and associated wetland type vegetation were smaller.

For the Riverside Oxbow study, all the classified images were transformed into ArcView shape files, each land use type being represented by a polygon. For analysis, the classified image was split into smaller polygons that corresponded to distinct areas of modified land use. Within each area of new land use, ArcView was used to determine the total land area of each present land use type. This information was used to identify the approximate acres and percentages of cover types for the different zones in the study area. The same breakdowns for the study area were used to project acre and land use changes anticipated with- and without-project conditions.

Figure 4. Study Area Zone Map

Habitat Suitability Indices and Habitat Units. In order to identify and evaluate potential restoration opportunities, it is necessary to establish a baseline of current habitat values in the study area for comparison, therefore, an overall evaluation of the quality of the existing natural resources based on their value as wildlife, avian, and aquatic habitat was conducted. Evaluation procedures used were the Habitat Evaluation Procedures (HEP) developed by the USFWS. HEP utilizes various habitat characteristics within sample plots to numerically define the comparative value of habitat quality based on a 0 to 1 scale, where 1 represents optimum habitat conditions and 0 represents habitat conditions of no usable value. HEP evaluates habitat based on Habitat Suitability Index (HSI) models for wildlife species that typify a targeted habitat type (i.e., bottomland hardwoods, grasslands, wetlands, etc.). For this study the indicator species used for evaluation of the grasslands were the red-tailed hawk, eastern cottontail, and eastern meadowlark. The species models used to assess the habitat value of the emergent wetland areas were the wood duck, raccoon, and green heron. Finally, the indicator species used to assess the value of the shrubland habitat types were the eastern cottontail, red-tailed hawk, raccoon, and scissor-tailed flycatcher. These species represent the various guilds associated with each habitat type. There was no specific aquatic habitat species model used in HEP evaluations for the Riverside Oxbow study area.

The HSI values represent the overall value that results from running an HSI model. Habitat units (HU) are derived by multiplying the overall HSI score from each habitat type by the number of acres of that habitat type in a given area. Because each of the study zones had more than one habitat type, values for each habitat type were evaluated and summed together for each study zone. Disturbed lands were assumed to have no usable value therefore assigned a value of zero.

Following are general descriptions of the existing conditions for the overall study area and then for each of the study zones specifically, including the number of acres of each habitat type along with the derived number of existing habitat units for each zone.

EXISTING CONDITIONS

General Description. Based on site visits by USACE, USFWS, and TPWD personnel, the study area contains several habitat and non-habitat land use types. A majority of the lands are grasslands, with most being manicured lawns, roadsides, dikes, constructed riverbanks, and parks consisting of bermudagrass (*Cynodon dactylon*), St. Augustine grass (*Stenophrum secundatum*), and Johnson grass (*Sorghum halepense*). There are patches of native grasses that contain little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), sideoats grama (*Bouteloua curtipendula*), and Indiangrass (*Sorghastrum nutans*).

The existing woodlands are mainly located along the oxbow and the original West Fork channel downstream of the oxbow, but there is also a large tract of woodlands along drainages located south of IH-30. The predominant tree species are sugar hackberry (*Celtis laevigata*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), cottonwood (*Populus deltoides*), red mulberry (*Morus rubra*), and pecan, with common understory species

including common greenbrier (*Smilax spp.*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), ragweed (*Ambrosia trifida*), and immature hardwood tree species.

There are small areas of wetlands located within the 100-year floodplain in the study area. These wetlands are palustrine, which means that they are non-tidal wetlands dominated by trees, shrubs, and the presence of emergent wetland vegetation. Most of these wetlands are seasonal wetlands occurring in shallow depressions. The tree and shrub species in the forested wetlands are the same species found in the riparian woodlands. Figure 5 is an infrared aerial photograph taken in the mid-1990s that illustrates the various vegetational types in the area. The yellow line represents the study area boundaries.

Much of the study area has been highly impacted by human activities. The degree and extent of the changes in habitat have directly influenced the vegetation composition and numbers and species of wildlife found in the area. Proximity of a vast urbanized human population, past indiscriminate hunting, predator control, use of pesticides and various forms of air, water and land pollution have been responsible for declines in wildlife resources. Wildlife that remains live in a modified natural habitat within the immediate influence of an encroaching urban complex. Common wildlife species are those tolerant of man's activities such as squirrels, rabbits, migratory songbirds and various small rodents.

Following are general descriptions of the existing conditions found within the study area for each of the project zones. The acres of each habitat type identified represent the results of the vegetation analysis described above. The number of existing habitat units identified for each zone represents the compilation of the value of all the habitat types found in each zone utilizing the HEP analysis described above.

Oxbow North. The north oxbow area includes the cutoff oxbow channel between Riverside Drive and Beach Street, its associated riparian area, an adjacent ponded area just upstream of Beach Street, the lands around the ponded area, and a small parcel of land between Riverside Drive and the upstream end of the cutoff channel.

The area is 110.90 acres in size, with the majority being grasslands (68.92 acres). Existing forest covers 26.26 acres and water covers 1.68 acres. Wetlands, totaling 2.22 acres, were identified along the edges of the existing ponded areas and cutoff channel bottom. Disturbed soils, associated with heavy grazing by cattle and horses, totaling 11.85 acres was identified surrounding the ponded area. Based upon initial results from use of the USFWS HEP, this area was found to contain a combined total of 70.13 habitat units for the various habitat types under existing conditions. Industrial and residential developments immediately north of the area have caused direct and indirect adverse impacts. Runoff from the adjacent disturbed areas contains high silt loads and associated urban debris. The existing wooded corridor is narrow and composed primarily of non-mast bearing trees, such as cottonwood, willow, soapberry, and green ash. These trees, which are common to the Upper Trinity River system, have become established following previous disturbances of the original vegetation. Existing hard mast trees (pecan and bur oaks) are generally isolated on grasslands at distances up to 100 to 300 yards away from the

channel. Photographs 1 and 2 show the oxbow channel and typical existing riparian vegetation.

The riparian channel along the upstream reach of the oxbow in this portion of the study area represents the first area of woodlands located downstream of the Clear Fork and West Fork of the Trinity River confluence. Beach Street, primarily because of its culverted underpass, presents a physical barrier to mammals, amphibians, reptiles and some bird species between the riparian resources associated with the Oxbow North reach and the riparian resources associated with the downstream segment of the oxbow and the West Fork of the Trinity River. The USFWS HEP procedures utilized in this study are based upon the assumption that quality of structure in the ecosystem is directly related to functional quality and production of environmental resources. The HEP models used for this analysis do not directly account for the disruptions in the functional value of the riparian habitat caused by Beach Street. Based upon professional judgment of the Corps of Engineers and U.S. Fish and Wildlife Service staff biologists, the HSI for the existing conditions of the riparian resources of the oxbow area was adjusted (weighted) to better reflect the adverse affect the lack of a bridge crossing has upon fish and wildlife resources. Results of the adjustment lowered the functional HSI value for existing forest stands in the Oxbow North zone from the initial 0.58 based on structure alone to 0.3. While not incorporated into the existing conditions computations, this adjusted value will be used in evaluating potential restoration opportunities for the zone, later in the plan formulation process.

Figure 5. Aerial Photograph of Study Area

The culverted crossing over the cutoff channel at Beach Street has a downstream invert that is several feet higher than the existing downstream water and ground surface elevations. In addition, the culvert serves as a barrier to movement of ground- and water-based species. Heavy traffic on Beach Street results in numerous road kills at the crossing. Photograph 3 and 4 shows the Beach Street culvert first from the upstream end and then from the downstream end looking back upstream.

Oxbow Center. This zone, as the name implies, lies between Oxbow North and Oxbow South. This zone is comprised of 124.53 acres of land. A review of old photographs reveal that the lands within this zone have apparently been used for truck farming in the past, but have been fallow for the past 3 to 4 years. A partial remnant channel of Sycamore Creek, formed following the construction of the modified channel of the West Fork adjacent to this area, holds local runoff for short periods of time each year providing a small seasonal wetland. The imagery used to classify vegetation did not detect the small wetland because it appears to be less than one acre in size. The lands in this zone are predominately grasslands (101.94 acres) and are currently being used to produce a single hay crop per year. The remaining 22.37 acres have been identified as disturbed lands, likely associated with internal roadbeds developed when the area was actively farmed. Currently, most of these roadbeds have become overgrown with grasses due to the lack of use; the exception is a road along the modified channel that is used by TRWD personnel for maintenance purposes. This zone also has several large individual pecan and bur oak trees scattered along the edges of the abandoned Sycamore Creek channel. The existing wildlife habitat value of this zone is 78.52 habitat units for all habitat types. Photographs 5 and 6 depict the large scattered mast trees and the existing grassland vegetation in the zone.

Oxbow South. The Oxbow South zone includes the area along the south and east banks of Sycamore Creek between IH-30 and the channel and a broader area between the modified channel and IH-30 extending from the west bank of Sycamore Creek to Riverside Drive. A parcel of land just west of Beach Street was not included in the study area within this zone because of the presence of a church. This zone also includes the confluence of Sycamore Creek with the modified channel, a low water dam downstream of Beach Street, and an existing 3.08-acre wetland. The most abundant terrestrial vegetation is grassland with dispersed wooded stands (29.46 acres). Disturbed areas cover an additional 1.47 acres. The existing wildlife value of the terrestrial and wetland habitat components of this site is approximately 24.23 habitat units. Photograph 7 shows the low water dam.

Gateway Center. This zone is located in the area immediately downstream of the Beach Street crossings of the improved channel and the remnant oxbow channel. It includes a triangular-shaped tract of land that contains the riparian zone along the south side of the oxbow and the north side of the improved channel. The zone consists of 27.31 acres of low quality woodlands and highly manicured grasslands with a total habitat quality of 6.73 habitat units. Specifically, this zone contains about 9.98 acres of existing forest, 9.22 acres of grassland and 7.6 acres of disturbed land associated with channel maintenance activities and a couple of old business sites, and less than half an acre each of water and wetlands. The location of the zone provides an important link between upstream resources and those associated with the riparian forest located downstream. Photographs 8 shows the business sites and buildings located in this zone.

Gateway South. This zone encompasses the Gateway Center zone both to the north and south across the oxbow channel and the modified channel. North of the oxbow, the zone generally includes the bottomland hardwood corridor located between Beach Street on the west, the park entrance road to Gateway Park on the north, and the first river bend below the confluence of the oxbow with the West Fork on the east. South of the modified channel the zone includes mostly grasslands from Beach Street on the west, the modified channel on the north, IH-30 on the south, and the first river bend below the confluence of the oxbow with the West Fork on the east. The zone, mainly consisting of grasslands, is about 45.93 acres in size. The grasslands make up about 25.33 acres. The riparian woodlands comprise 15.73 acres. Water and wetlands combined account for just over one acre with the remaining 3.45 acres being disturbed soils. This zone has linkages to Gateway Beach, Gateway East, and all components of the oxbow. Total existing habitat values in this zone were determined to be 12.33 habitat units.

Gateway Beach. This zone, located between Beach Street and Gateway Park and north of the park entrance road off of Beach, has been heavily disturbed by past activities. Approximately 160 acres in size, this zone is comprised of approximately 0.30 acres of open water, 1.90 acres of wetlands, 23.77 acres of woodlands, 86.90 acres of grassland, and 47.12 acres of disturbed soils. Total existing habitat value for this zone is calculated at 21.70 habitat units. Gravel and soil mining activities resulted in the creation of several ponds and wetlands, some of which were subsequently filled under Section 404 permit conditions issued in November 1987. In addition to filling some of the ponds and wetlands, the ground elevation in a portion of the zone was raised out of the 100-year floodplain. The filled portion of the zone has largely reestablished a grass cover; however, bermudagrass dominates the area. Although no pads or buildings have been constructed on the fill, future without project conditions indicate that little additional filling would be required to make the portion of the tract that fronts Beach Street a highly desirable location for commercial development. As mitigation for fill activities, a small wetland area was contoured to connect to one of the residual lakes and a little bank sloping was conducted to foster some moist soil development. These areas provided adequate mitigation for the past filling activities; however, substantial improvements could still be implemented to provide substantially greater fish and wildlife habitat benefits. Site reconnaissance noted that the large pond is supporting winter stopovers of teal, gadwall, and mallards numbering close to a hundred individuals. Some of the native vegetation around the edge of the ponds also supports red-winged blackbirds, cardinals, and other songbirds. Non-native shrubs have begun to proliferate around the higher banks of the lake and, left unchecked, will greatly reduce future wildlife habitat values. The water source for the larger lake appears to be local runoff and drainage from the residential and commercial neighborhoods to the north. A smaller lake located adjacent to the larger lake had no visible water during the first late winter site visit and only a slight amount after a 5-inch rainfall event in the area.

Gateway Park. This zone includes all the lands (257.09 acres) south of East 1st Street between Gateway Beach and Gateway East. This entire zone is encompassed



Photograph 1. Oxbow channel.



Photograph 2. Riparian vegetation along the oxbow channel.



Photograph 3. Upstream end of oxbow culvert at Beach Street.



Photograph 4. Downstream end of oxbow culvert at Beach Street.



Photograph 5. Scattered hard mast trees in Oxbow Center.



Photograph 6. Grassland vegetation in Oxbow Center before mowing.



Photograph 7. Low water dam downstream of Beach Street.



Photograph 8. Buildings and business sites located in Gateway Center.

within Gateway Park, a city of Fort Worth public park that includes existing recreation facilities, such as softball diamonds, soccer fields, hiking and biking paths, picnic areas with pavilions, etc. The majority of these lands, 120.09 acres, are maintained grasslands, with about 68.60 acres of woodlands and 68.40 acres of disturbed areas. It was determined the Gateway Park zone provides a combined 43.01 habitat units under existing conditions.

Gateway East. This study zone extends downstream of Gateway Center to the East 1st Street bridge. Added later during the plan formulation period, the zone was found to contain tracts of high quality riparian woodlands, tracts where the riparian corridor is very narrow and comprised of non-mast producing light seeded invader trees and shrubs, and a tract that has been severely degraded as a result of past use as drying beds for a waste water treatment processing plant. The entire east corridor contains 138.72 acres providing a combined 69.05 habitat units. This reach is more heavily wooded than other reaches in the study, containing 97.01 acres of riparian forest. The remainder of the site consists of 0.72 acres of water, 5.62 acres of wetlands, and 34.94 acres of grassland. Only 0.43 acres of disturbed soil was identified.

Access through the zone is relatively easy due to presence of a small, concrete recreation trail. The trail is narrow and its current use pattern does not appear to conflict with existing or potentially improved future wildlife uses. An early spring visit through this zone resulted in the observation of numerous chickadees, warblers, wrens, cardinals, crows, hawks, and other birds within the better quality woodlands. Another feature observed adjacent to the better quality woodlands was an old naturally occurring oxbow remnant that currently receives water from the West Fork of the Trinity River only during periods of high flows; in fact, nearly out of bank levels. The oxbow contained water during the site visit and debris and the direction of the lean of soft-stemmed vegetation indicated that the water had entered the oxbow through a channel located between the eastern end of the remnant oxbow and the West Fork. Fish and amphibians were observed utilizing the newly inundated areas in the bottom of the oxbow.

One other small body of water is located at the extreme northern end of the drying beds. While the original function of this area is unclear, it apparently fluctuates in depth over the course of the year. During the site visit, about 25 percent of the area was inundated. Stubble from mowing was visible in some of the inundated area and all of the non-inundated area. About a dozen teal and wood ducks were observed on this small lake. Although somewhat sheltered, the lack of forested vegetation to the north and the lack of tall grasses around the perimeter of the wet area likely limit the use of this area by waterfowl. The drying beds associated with the abandoned wastewater treatment facility are grown over with grasses and some young trees including willows, hackberry and boxelder.

Tandy. Of the 158.60 acres making up the Tandy zone, almost 59.87 acres are wooded with mixed grasslands and shrublands occupying most of the remaining area, or 90.27 acres. Vegetative cover imagery identified 7.71 acres of disturbed lands; however, it is believed that the amount of disturbed soils have more than doubled since the date the imagery was captured. Total existing habitat value of this study reach is 68.78 habitat units.

The eastern portion of this study zone contains all of Tandy Hills Park, an approximately 106-acre parcel of land owned by the city of Fort Worth and designated as parklands. The only recreational facility in this park is a small playground, less than 2 acres in size, located along View Street at the southern end of the property. In addition to the parklands, this zone includes approximately 53 acres of land west of the park. Most of these lands are in private ownership, with the majority being portions of long narrow residential tracts that run from Scott, Young, and View streets to the right-of-way of IH-30 to the north. The remaining tracts of land in this zone are located along Ben Street and are zoned for commercial use. The entire zone is unique within the study area due to the highly diverse terrain and the different vegetational compositions that result. These include a relic native prairie on the upper slopes which is being modified due to the invasion of woody species and human disturbances, particularly erosion problems on the privately owned lands to the west. Photograph 9 and 10 show the Tandy zone, including both the grasslands with invasive shrubs and the wooded riparian stands.

Prior to the construction of IH-30, this area was an integral component of the riparian and associated upland ecosystem of the West Fork of the Trinity River. The construction of the highway served to separate the bottomlands in this zone from the riparian corridor along the river channel to the north and, because the highway's bed was raised, removed the bottomlands from the 100-year floodplain. The area, which is located south of IH-30 across from Gateway East, contains numerous riparian fingers associated with narrow rivulets that now connect to the West Fork of the Trinity River through a series of culverts under the freeway. Grass species, mesquite, and eastern red cedar dominate the open plateaus with the low draws and drainages being dominated by woody shrub and tree species. Besides topography, the reason for the varied vegetation associations in this zone is due to the different soils that underlie the site - Aledo, Aledo-Bolar, and Frio soil types. Each of these soil types has a characteristic natural plant community.

The Aledo soil is situated on the upper shelves of high ground. The climax plant community should be a prairie of mid- and tall-grasses interspersed with an abundance of forbs (wildflowers). Historically, little bluestem would have made about 45 percent of the composition with Indiangrass, big bluestem, and switchgrass making up another 15 percent. Other common grasses would include sideoats grama, tall dropseed, slim tridens, silver bluestem, Texas cupgrass, hairy grama, buffalo grass, Texas wintergrass, and vine-mesquite. Forbs would be numerous and include purple paintbrush, Engelman daisy, prairie clover, Maximillian sunflower, heath aster, compass plant, golden dalea, penstemon, and gay feather. The presence of many of these species in association with one another indicate that this site is a relic of the Grand Prairie or Fort Worth Prairie that once covered much of the land in the region. Currently, the grasslands here are being invaded by woody shrub species, mesquite, and eastern red cedar.

The Aledo-Bolar soil is on the slopes. The Bolar soil climax plant community is true prairie consisting mainly of tall grasses, such as little bluestem, switchgrass, big bluestem and Indiangrass. Woody vegetation includes elm, hackberry, plum, live oak, aromatic sumac, New Jersey tea, and white honeysuckle.



Photograph 9. Grasslands with invasive shrubland vegetation.



Photograph 10. Grasslands with mesquite in foreground and riparian stringers along rivulets in background.

The Frio soil occurs along the creeks and in the bottomlands of the zone. The climax plant community for the Frio soil is mid- and tall-grasses with a tree canopy of pecan, elm, bur oak, and cottonwood. Currently, there is an invasion of non-native woody species, such as privet, occurring on the slopes and in the understory of the bottomland hardwoods in this area. There are many wooded stands, especially in the eastern side of the Tandy zone where the only native vegetation to be found is the canopy trees. Photograph 11 shows the extent of the privet and other non-native vegetation in the understory of the bottomland hardwood stands.

An assessment of Tandy Hills Park conducted by representatives of the Fort Worth Nature Center and Refuge, part of the Fort Worth Parks and Community Services Department, indicates that in most of the areas where prairie still exists, the land is situated on slopes that were less desirable for livestock and unsuitable for farming. Examining aerial photos from the early 1940s indicate that the park was in excellent condition and, at that time, had less woody growth than similar areas nearby. Currently there appears to be more invasion of the grasslands from eastern red cedar, mesquite, and woody shrubs and a tremendous problem of non-native species, such as privets, invading the understory of the wooded sites. In the absence of corrective management, the native grasslands in this zone will eventually be converted to low quality woodlands.

While steps have been taken over the years to reduce disturbances to the Tandy zone, especially the parklands, there are still signs of erosion. Most of the erosion appears to be the result of illegal usage of the area by off road vehicles and random pedestrian hiking and biking trails that have damaged the vegetation that helps to stabilize the slopes. On the slopes and upland areas, these areas of damaged vegetation provide locations for runoff following rain events. This runoff washes additional soil and vegetation from the hills further exacerbating the problem and, over time, the soil on these slopes sloughs off and the problem magnifies (see Photograph 12). The existence of numerous riparian fingers with associated draws and rivlets in this zone that directly connect to the West Fork of the Trinity through a series of culverts under IH-30 mean that this soil quickly makes its way into the river causing increased sedimentation and turbidity and reducing the quality of the aquatic habitat. Photograph 13 depicts one of the narrow rivlets within the Tandy zone and photograph 14 shows the sedimentation that is occurring in the river channel just downstream of some of the culvert outfalls connecting the Tandy zone to the West Fork of the Trinity River. In addition to increasing sedimentation, the slope erosion and the encroachment of invader species in this zone, both in the understory vegetation of the bottomland hardwoods and in the native prairie grasslands, diminish the terrestrial wildlife habitat value of the area.

On the private land adjacent to Tandy Hills Park, the erosion damage has been much more severe. A restaurant, once located on top of a hill between the two areas, has been removed but considerable disturbance in the form of the slab, parking lots, and bulkheading to protect the foundation remains (see Photographs 15 and 16). Other slope alterations in the vicinity and trash dumping at the end of the cul-de-sac access have decreased habitat quality of the area. Photographs 17 and 18 show a large area of disturbance from what appears to be an attempt to make an access route, which has significantly impacted the vegetation in the western end of the zone. Erosion and the

resulting sedimentation transport into the river channel, the transportation of seed sources from the non-native invasive plant species, and the loss of habitat quality and diversity within this zone poises a significant threat to the other zones within the study area, and to the terrestrial and aquatic habitat of the lands along the West Fork downstream of the Tandy zone.

Existing Conditions Summarization of Acres and Habitat Units. Table 2 displays the total acres, the habitat units for each major habitat type, and the total habitat units for each project zone as determined during the existing conditions investigations.

Table 2
Summary of Acres and Habitat Units for Existing Conditions

Project Zone	Forested		Wetland		Grassland		Water		Disturbed	Total	
	Acres	HUs	Acres	HUs	Acres	HUs	Acres	HUs	Acres	HUs	Acres
Oxbow North	26.26	15.23	2.22	1.16	68.92	53.07	1.68	0.67	11.85	70.13	110.93
Oxbow Center	0.22	0.03	0.00	0.00	101.94	78.49	0.00	0.00	22.37	78.52	124.53
Oxbow South	0.29	0.16	3.08	1.60	29.17	22.46	0.00	0.00	1.47	24.22	34.01
Gateway Center	9.98	5.29	0.34	0.18	9.22	1.20	0.17	0.06	7.60	6.73	27.31
Gateway South	15.73	8.33	1.13	0.59	25.33	3.29	0.29	0.12	3.45	12.33	45.93
Gateway Beach	23.77	9.51	1.90	0.76	86.91	11.30	0.30	0.12	47.12	21.69	160.00
Gateway Park	68.60	27.40	0.00	0.00	120.09	15.61	0.00	0.00	68.40	43.01	257.09
Gateway East	97.01	62.09	5.62	2.13	34.94	4.54	0.72	0.29	0.43	69.05	138.72
Tandy	59.87	24.55	0.80	0.00	90.27	44.23	0.00	0.00	7.71	68.78	158.65
TOTALS	301.73	152.59	15.09	6.42	566.79	234.19	3.16	1.26	170.40	394.46	1,057.17

Aquatic Resources. The aquatic resources in and adjacent to the Riverside Oxbow study area include two low water dams constructed to hold more water at specific points along the river channel. These dams are the 4th Street dam located just upstream of the study area and the new Beach Street dam located within the study area river reach. During site reconnaissance for the existing conditions phase of this report, it was observed that one of the major limiting factors for aquatic habitat quality in the study area was the lack of vegetation along and overhanging the rivers edges. This overhanging and bank vegetation provides food sources, shade, cover, and reproduction sites for multiple numbers of aquatic species, including invertebrates, fish, waterfowl, and shore and wading bird species. Reconnecting old oxbows to the main channels and adding low flows through these old river meanders was identified by the study team as a way to improve the quality and quantity of aquatic habitat in the area by providing this type of bank and

overhanging vegetation without compromising flood flow functions designed for the main channels.

The river, ponds, and wetlands in the study area support a variety of aquatic species, but there is relatively little diversity in the aquatic invertebrates and fish species found. Within the river reach of the study area, concerns about the quality of the fishery habitat include turbidity, high temperatures, oxygen-demanding pollutants which interact to produce lower dissolved oxygen concentrations, excessive algal growth, and, according to recent testing by the TNRCC, the presence of PCBs and chlordane somewhere in the sediments which bioaccumulate in the tissue of fish. Physical habitat for fish is scarce, particularly in the channelized reaches within the Fort Worth Floodway upstream from the project area and in the improved channel from Riverside Drive to the low water dam below Beach Street.

The wetlands and open water ponds found in the floodplain adjacent to the river generally support the same types of aquatic invertebrates and fish species as the river channel. The wetland areas provide emergent vegetation and other physical habitat that is lacking in the river and most of the ponds; however, because of the altered water flow within the river as a result of flood protection reservoirs and channelization projects upstream which allow for only occasional overbank flows, these wetland areas generally do not hold water throughout the year, but often dry up during the long, hot summer months. For this reason, the diversity of the aquatic invertebrates remains low, as does the diversity of the fish species that the invertebrates support.

Threatened and Endangered Species. The following information indicates that a few federally protected species may occasionally migrate through the study area, but none are expected to utilize the habitat of the land parcel in question.

Table 3
Federally Listed Threatened And Endangered Species
Tarrant County, Texas
(Source U.S. Fish And Wildlife Service, 2002)

Common Name	Scientific Name	Listing Status
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	*candidate for listing
Interior least tern	<i>Sterna antillarum</i>	Endangered
Whooping crane	<i>Grus americana</i>	Endangered
*Mountain plover	<i>Charadrius montanus</i>	*proposed as threatened

Data from the Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Service (USFWS) were used to determine the potential for the study area to support the presence of state and federally protected species and sensitive areas. According to the Texas Biological and Conservation Data System of TPWD, no occurrences of sensitive species or natural communities are known in the vicinity of the study area. The USFWS indicates that the area would be within the known range of three species including the threatened bald eagle, the endangered interior least tern and the whooping crane. In

addition, the USFWS noted that the area under study would also be within the known range of the mountain plover, a candidate that has been proposed for listing as a threatened species, and the black-tailed prairie dog, which is a candidate for listing as a protected species. However, according to the USFWS, there is no designated critical habitat for listed species in Tarrant County.

Cultural Resources. The study area has been inventoried for cultural resource properties. Results of a Phase I survey and geoarcheological work conducted in June and July of 2002 indicate the presence of one prehistoric site within the oxbow area. This large site consisting mostly of burned rock, animal bones and mussel shell is located in the southwest portion of the oxbow area along the remnant of Sycamore Creek. It is considered to be potentially eligible for the National Register of Historic Places.

The preliminary assessment, Phase I survey, and geoarcheological study indicate that the area near the improved channel has been previously disturbed by channelization and is not likely to contain intact archeological properties. The preliminary assessment also indicates that the study area consisting of the level flood plain area within the meander has been disturbed by agricultural use over several decades that would have likely disturbed any near surface sites. However, the old river meander margins are essentially intact and several areas were noted that would indicate alluvial surfaces have been formed historically across the area. The potential for buried prehistoric properties is high within the oxbow and adjacent to the unchannelized portions of the river. Deep testing was conducted in the area of the proposed wetland complex, lake, and drainage channel. One prehistoric site was found in the area proposed for the drainage channel and will require additional testing or avoidance in order to comply with relevant cultural resource law. Deep testing was also conducted to the south of the West Fork of the Trinity in an area that has been proposed for deep impacts. No archeological sites were identified in that area. If deep impacts are proposed for areas not currently under consideration, additional deep testing will be required.

The preliminary literature review indicated the presence of a historic property consisting of a named stables and racetrack from approximately 1893. No evidence of the historic property was identified by the Phase I survey. Additionally, no other surface sites were identified by the survey. A cultural resources report, to be included as an appendix to the feasibility report, will present the results of the cultural resources investigations.

Since there were no flood damages to structures identified in this area, it is not anticipated that any proposed restoration project would include residential buy-outs or removals. Because of this, no disproportionate impacts to minority or low-income populations are anticipated which would meet the criteria for consideration per the Executive Order (EO) on environmental justice.



Photograph 11. Invasive privet in understory in Tandy zone.



Photograph 12. Erosion from off road vehicle track following rain event.



Photograph 13. Rivlet in Tandy zone.



Photograph 14. Sediment deposit in river channel downstream of culvert outfall.



Photograph 15. Bulkheading and erosion on slope below restaurant slab.



Photograph 16. Part of restaurant slab, bulkheading, and disturbed areas.



Photograph 17. Large disturbed site in western portion of Tandy zone in March.



Photograph 18. Same large disturbed area as above in July.

Hazardous, Toxic, and Radioactive Waste (HTRW). In the summer of 2001, a Hazardous, Toxic, and Radioactive Waste (HTRW) Initial Assessment was completed for the purpose of identifying possible hazardous wastes and/or other environmental concerns within the Riverside Oxbow segment of the overall Clear Fork and West Fork study. Since the Riverside Oxbow study area was selected for more detailed study in November 2001, the study area has expanded in size to include the Gateway Park and Tandy Hills areas. Further HTRW Initial Assessments were completed for these new areas in February of 2002.

The HTRW Initial Assessment involved an environmental records search and a site visit. Environmental Data Resources (EDR), Inc. was procured to perform an environmental database search of all known sites of hazardous, toxic and radioactive waste concerns within a 1-mile radius of the study area. This search meets the requirements of ASTM E 1527-97, Standard Practice for Environmental Site Assessments. Three sites, within 200 feet of the proposed project lands, were identified as potentially hazardous. The locations listed are: TXI Operations at 3601 Lawnwood Avenue, H.J.G. Trucking at 701 Denair Street and Nationsrent at 1315 Riverside Drive. All three of these sites are in the commercial and light industrial area north of the oxbow. The report indicates that each of these sites has a Leaking Underground Storage Tank (LUST), which have impacted ground water. To date, none of the sites has received closure from TNRCC. However, all of the LUST sites are located outside of the boundary of the proposed project area and are not anticipated to adversely impact project lands in the future.

As a result of investigating the sites identified by the EDR search, further information was discovered regarding the TXI site. This site was the subject of controversy regarding hydrocarbon contamination in the soil during the installation of a north-south sewerage line sewerage line about three years ago. At that time, an investigation was conducted relative to the needs of the construction project and the project was completed. However, the site was not remediated and the hydrocarbons remain in the soil. The Fort Worth Environmental Department provided the study team with a map of the area identifying sites where soil samples were collected for analysis and the results of the analysis. There seems to be some conflicting information as to the extent of contamination. Preliminary indication is that project lands do not extend far enough north of the channel to intrude into this contamination. However, if the footprint of the project changes and subsequently incorporates some of this land, or if further delineation indicates that the existing contamination extends into potential project lands, the study team will work with the local sponsor and the city of Fort Worth to determine if additional investigation and possible remediation actions are warranted, or if the project should avoid the contaminated site.

The proposed project includes a wetlands area located within the sludge beds of an abandoned wastewater treatment plant. The city of Fort Worth has performed an investigation of the site in question and has provided a copy of the draft report to the study team. The report indicates the presence of several metals in the soils at levels exceeding TNRCC regulations for residential exposures. Fort Worth is currently performing a voluntary cleanup action of the site and is coordinating with TNRCC to achieve a clean closure; therefore the project will not be affected by the current conditions.

Hydraulics and Hydrology. As per regional floodplain management policy requirements, the CDC model was used as a basis for the baseline conditions modeling done for the Riverside Oxbow study area.

The baseline conditions model was further refined to incorporate recent modifications to the Fort Worth Floodway (from 4th Street to Riverside Drive), and modifications from Riverside Drive to Beach Street. The TRWD completed channel and bank excavation operations from the 4th Street Dam to Beach Street, including the construction of the 4th Street dam completed in November 1999. The dam is a roller-compacted concrete dam with a crest elevation 500.5 NGVD and a length of 284 feet. Work in this reach has resulted in an increase of conveyance for flood events within the Fort Worth Floodway. In addition, the TRWD recently constructed a low water dam below Beach Street. This dam is also a roller-compacted concrete dam with a crest elevation 494.5 NGVD and a length of 244 feet. This project was reviewed by USACE under the CDC program and determined to meet the applicable CDC hydrologic and hydraulic criteria.

The location of the project downstream of the Fort Worth Floodway and within the region covered by the ROD and CDC process results in a set of criteria that must be followed for any proposed project design that impacts lands within the floodplain. These criteria include: 1) no rise in the design flood water surface profile (SPF) is allowed (USACE); 2) no rise in the Base Flood Elevation (BFE) 100-year flood (Federal Emergency Management Agency); 3) condition outlined in the CDC process must be met; 4) Section 404 Record of Decision (ROD) that establishes hydrologic and hydraulic criteria for projects within the Trinity River floodplain in the Dallas-Fort Worth area, including no rise in water surface profile, no loss of valley storage, zero percent loss of valley storage in the 100-year event and no more than a maximum of five percent valley storage loss for the SPF event. The modified baseline conditions model was run to set existing conditions hydraulic values as a basis for evaluating changes to existing conditions values as the result of implementation of any proposed project design or restoration features. Applicable mitigation for water surface increases and valley storage loss may be necessary and will be incorporated in detailed project design.

A literature review was conducted by resource and hydrologic professionals to determine what the historic flow conditions would have been like on the West Fork and in the study area prior to implementation of any of the reservoirs or flood control projects upstream. Since construction of Lake Worth was completed by the city of Fort Worth in October of 1914, it was necessary to look for descriptions from the late 1800s to the early 1900s. Generally, narrative descriptions taken from old accounts by early settlers in the Fort Worth area or accounts by explorers traveling across the Cross Timbers and Prairies region of Texas indicate that the Trinity was a wide, shallow, slow moving stream under normal conditions, with depths averaging 2 to 5 feet. Indications are that the Trinity River had areas of dry channel bed along with deeper pools that served as refugia for recolonization of aquatic species only following extended periods of drought. As might be expected, the river was the main source of water for early settlers, with the area adjacent to the confluence of the West and Clear Forks being one of the early settlement sites.

FUTURE WITHOUT PROJECT CONDITIONS

The future without project conditions described in the following paragraphs are equivalent to a description of the “no action” alternative. In order to effectively evaluate changes to the environment of Riverside Oxbow study area if proposed ecosystem restoration measures are implemented, it is necessary to forecast likely future environmental conditions if they are not. Because the study area is located along a major river within a highly urbanized city, projection of any future environmental conditions needs to consider the upstream watershed along with the immediate study area.

Fort Worth, as part of the Dallas-Fort Worth Metroplex, is one of the fastest growing areas of Texas. It is anticipated that this population growth and development would continue. As a result, there would be additional construction and increased amounts of impervious surfaces such as roads, parking lots, and structures. These factors would add to the runoff within the Clear Fork and West Fork watershed and would increase the severity and/or frequency of flood within those neighborhoods currently affected by flooding problems, could add to the number of structures inundated, and would probably slightly raise the flood profile within the study area over time in the absence of any additional flood damage reduction activities.

It would be expected that water quality in the Clear Fork and West Fork watershed would degrade slightly to moderately in the future as Fort Worth and surrounding communities continue to develop. The construction of new residences and businesses would produce additional sediment load from runoff of construction sites. After completion, the increases in impervious surface area, traffic, lawn fertilizing and other human activities would have an adverse impact on the watershed. Degradation of the water quality would reduce the numbers of aquatic biota. The overall diversity of fishes and other aquatic species is already moderate; further loss of aquatic biota could therefore be significant.

Encroaching development and human activities would also be expected to negatively impact the watershed's existing vegetation, as well as that within the immediate study area. The forested riparian vegetation zone within much of the watershed is already either very narrow or non-existent and past trends indicate that this habitat type is being lost at a significant rate in the Upper Trinity River Basin. The number and size of the gaps in this riparian corridor would continue to increase and there would be fewer acres of forest in the future. The loss of habitat, particularly the bottomland hardwoods, would reduce the numbers of wildlife and bird species within the watershed. This is especially true for migratory songbirds, which are particularly susceptible to the loss of habitat along their migration routes.